

Composite layered overlay: micro-invasive approach

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Abstract

To effectively meet the current function and aesthetic needs of modern dentistry, composites must allow operators to easily replicate layerings without renouncing the restoration effectiveness and durability. This case report describes the composite layered overlay technique restorations of the mandibular posterior teeth that can successfully replace invasive direct restorations.

Keywords: composite layered overlay, indirect restorations, composite resin restorations.

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INTRODUCTION

The latest discoveries in dentistry allow us to confirm the fact that occlusal balance and stability are the most precious treasure to be preserved and, in the most serious cases, re-established [1, 2].

The latest diagnostic tools and newest restoration materials allow us to perform both conservative and prosthetic restorations [3]. Such new generation materials guarantee the highest aesthetic standards and thus allow material selection on the basis of its mechanical-physical properties.

The use of new-concept Micerium's Enamel Plus HRI BIO Function plays a fundamental role when dealing with partial layered restorations [4]. Its innovative Bis-GMA and BPA-free formula makes Enamel Plus HRI BIO Function an ideal choice to preserve occlusal balance over time and ensure the highest aesthetic standards.

The top level reached by aesthetic dentistry has boosted massive research on the mechanical properties of materials and their more and more effective response to compression strength. Micro-hybrid composites have proven an ideal option also when treating extensive

solutions in the posterior areas using either direct or indirect technique [5]. Enamel Plus HRI BIO Function allows perfect camouflage restorations respectful of the newest E-F-P trend.

The aim of this report is to demonstrate how clinical situations which would have formerly been approached through conventional, invasive solutions – i.e. ceramic crowns – can now be approached through equally reliable indirect, layered composite solutions and adhesive overlays.

Case report

The thirty-three-year-old female patient came to our clinical practice with the old inadequate posterior restorations (fig. 1). Previously vital teeth 45 and 46 were restored with I and II Black's class. After old fillings and caries removal, teeth were prepared for the overlay restorations. Impressions were traditionally taken after preparing the natural elements so as to preserve the dental tissues' health (fig. 2, 3).

The space amount needed to perform composite restorations must never be lower than 1.5 mm overall. Such necessary space is assessed after developing class



Fig. 1. Initial clinical situation

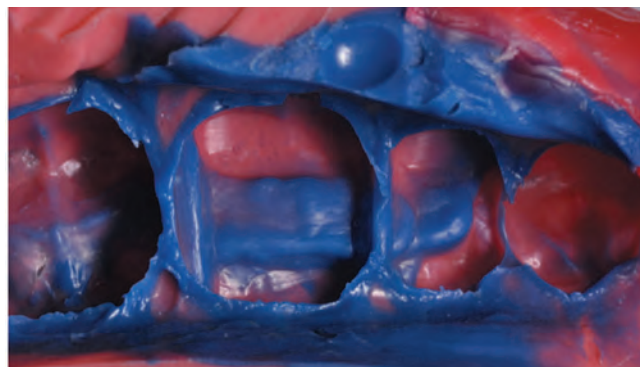


Fig. 3. Traditional impressions were taken

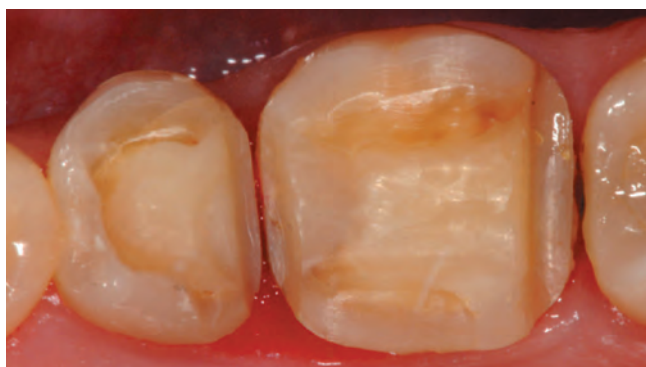


Fig. 2. Teeth after preparation



Fig. 4. Plaster models to control occlusal preparation

4 white plaster work-models, which are subsequently placed in an articulator (fig. 4).

Once the model has been sectioned and after performing white wax spacing, the first composite layer is applied to seal the finish margin, EF 3 is used for the inner side while UD4 is used for the outer part. Each composite layer must be light-cured for 15 sec (fig. 5).

The external perimeter of the elements is completed through shelling by EF3, following the residual profile (fig. 6). A first functional check-up in the articulator is carried out before proceeding to internal morphological filling (CORE).

The inner nucleus is built with UD3 dentine through cone-technique respecting functional orientation. The occlusal morphology of secondary elements and margin crests is completed with EF3 enamel. Once composite overlay layering is completed a paramount step is post-polymerization for 9 minutes at 80°C min. temperature.

Anatomical finishing is carried out after polymerization and overlays are mechanically polished on the work-model by using SHINE C Paste. Once the elements have been removed – after destroying the model – contact points, insertion and margin are carefully checked on the non-

sectioned master model. At the point, some stains (black on brown 2) could be applied to highlight primary grooves (fig. 10).

Layered composite overlays are now finished and ready to be delivered at the dental clinic. After sandblasting the inner surface with 50 micron aluminium oxide in order to facilitate adhesion, delivery will be 'model-free' and requires specifically designed packaging. An interesting element in our restoration is the overlay bonding which is performed by using the same Enamel Plus Hri Bio Function (Micerium) heated composite formerly used in the lab.

DISCUSSION

This micro-invasive approach does not require any complex clinical procedure and proves cost-effective and totally satisfactory for the patient [6]. Making clinical decisions about indirect resin composite restorations is not always easy, especially when the professional is faced with issues related to increased wear of the remaining tooth structure, time and cost without having the clear advantage of longevity compared to direct resin composite restorations.



Fig. 5. Preparation margin is applied with the composite layer



Fig. 8. Inner nucleus



Fig. 6. Completed external edge



Fig. 9. Completed secondary anatomy



Fig. 7. Functional check-up



Fig. 10. Second check-up on the master-model

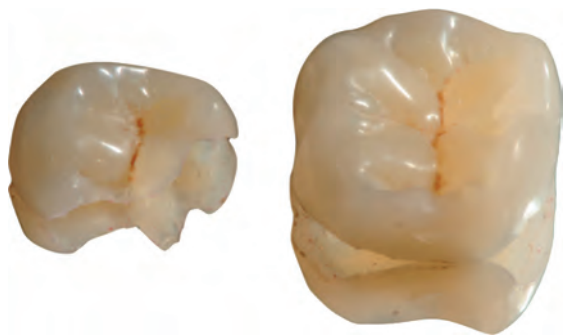


Fig. 11. Free-model layered composite restorations



Fig. 12. Occlusal view of the layered composite restorations in situ

There are few clinical studies that compare direct and indirect composite restoration [7-9]. According to the results of a review by Hickel and Manhart [10], annual failure rate of composite inlays and onlays ranged from 0% to 11.8%. Concerning direct posterior composite restorations, it has been reported by Manhart et al. annual failure rates from 0, 3% to 4.5%, in an observation period of 3–17 years [11]. Regarding indirect composite restorations, different studies have shown annual failure rates from 1.6% to 4.8% after 5–11 years [12, 13].

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Conflict of interests:

The authors declare no conflict of interests.

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